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Via Electronic Filing

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Room TW-A325
Washington, D.C. 20554

**Re: Nextivity, Inc. Ex Parte Comments in Support of Expedious
Elimination of the Personal Use Restriction on Provider-Specific
Consumer Signal Boosters -- WT Docket No. 10-4**



Dear Ms. Dortch:

Nextivity, Inc. (“Nextivity”),¹ by its undersigned counsel, hereby submits these ex parte comments in support of the immediate elimination of the “personal use” restriction for the operation of Provider-Specific consumer signal boosters, a class of booster device that may be developed and deployed only with the close cooperation of and in consultation with affected CMRS licenses holders. As a leading innovator in signal booster technology, Nextivity shares the Commission’s twin goals to ensure that FCC rules permit the deployment of only high quality, booster technology proven to cause no harm to wireless carrier networks while enabling users to benefit from these important wireless coverage solutions to address current and growing needs. To these ends, Nextivity urges the Commission to: (1) take the final step in the long-pending rulemaking proceeding in this docket by immediately issuing an order eliminating the “personal use” restriction for Provider-Specific Consumer Signal boosters, and (2) if the Commission decides to proceed with considering elimination of this restriction for *Wideband* boosters, a completely different class of booster devices presenting different technical and operational risks to wireless networks, the Commission should do so in a separate rulemaking in which potential technical harm issues, including impact on interference and network capacity, and any appropriate testing, can be fully considered.

¹ As set forth in other filings in this proceeding, Nextivity is a U.S.-based leader in the development of advanced booster technology.

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I. The Commission Should Proceed Immediately to Adopt an Order Eliminating the Unnecessary Restriction on “Personal Use” of Provider-Specific Consumer Signal Boosters

A. The Commission Has Conducted A Robust Notice and Comment Process and The Proposal Garnered Unanimous Support

The Commission first proposed to eliminate the "personal use" restriction for Provider-Specific consumer signal boosters in 2014 in the context of a Further Notice of Proposed Rulemaking (“FNPRM”).² Comments and reply comments were long ago submitted and no technical or other concerns were raised in response to the FNPRM or in the intervening two and half years since the Commission initially called for public input.³ In fact, the record shows only unanimous support from carrier and user interests alike for the prompt elimination of the “personal use” restriction on Provider-Specific signal boosters.⁴ There is no question that there is a real and growing demand and that this proposal has been subject to a robust regulatory process that has been completed all but for Commission action.

Given that elimination of the restriction for Provider-Specific signal boosters presents no risk to CMRS license holders, the restriction serves no regulatory or technical purpose and stands only as an unnecessary roadblock to further deployment of a cost-efficient technology that would help to make full use of our nation’s wireless services and infrastructure. Significant wireless coverage gaps still exist today,⁵ but this FCC rule continues to prevent small businesses,

² *Amendment of Parts 1, 2, 22, 24, 27, 90 and 95 of the Commission’s Rules to Improve Wireless Coverage Through the Use of Signal Boosters*, Order on Reconsideration and Further Notice of Proposed Rulemaking, WT Docket No. 10-4, FCC 14-138 (rel. Sept. 23, 2014).

³ Moreover, the Commission sought to refresh the record in this docket in a Public Notice soliciting comments on the current state of consumer signal boosters. *Wireless Telecommunications Bureau Seeks comment on the Current State of Consumer Signal Boosters*, Public Notice, WT Docket No. 10-4, DA 16-221 (rel. Feb. 29, 2016). In response to that Public Notice, no party raised any concern with the pending proposal to eliminate the "personal use" restriction for Provider-Specific boosters.

⁴ *See, e.g.*, Comments of T-Mobile USA, Inc. at 2, WT Docket No. 10-4 (filed Dec. 29, 2014); Comments of T-Mobile, Inc. at 3-4, WT Docket No. 10-4 (filed Mar. 30, 2016); Comments of Enterprise Wireless Alliance, WT Docket No. 10-4, (filed Dec. 29, 2014).

⁵ *See, e.g.*, Remarks of FCC Chairman Ajit Pai at Carnegie Mellon University’s Software Engineering Institute, “Bringing the Benefits of the Digital Age to All Americans,” Pittsburgh, Pennsylvania, at 5 (Mar. 15, 2017) (discussing importance of making mobile broadband in parts of American without wireless service, as “wired and wireless broadband networks are core components of our nation’s infrastructure.”) (“Pai Carnegie Mellon Remarks”); Remarks of Commissioner Ajit Pai at CCA’s 2016 Annual Convention, Seattle, Washington (Sept. 21, 2016) (noting the importance of “ensuring that every American in the country has access to advanced wireless services.”); Remarks of Commissioner Ajit Pai at the Brandery, “A Digital Empowerment Agenda,” Cincinnati, Ohio, at 2 (Sept.

enterprises, public institutions, public safety responders, and others from taking advantage of this important wireless coverage solution, and stymies further innovation in this sector. This is precisely the kind of restrictive unnecessary regulation that Chairman Pai aims to abolish.⁶ Accordingly, Nextivity urges the Commission to act now to remove the “personal use” restriction currently in the rules as it applies to Provider-Specific consumer Signal boosters.⁷

With respect to the recent petition for a new rulemaking to eliminate the restriction for *wideband* boosters, Nextivity believes that such a step may be worth considering but it is imperative that such effort is done entirely separate from the existing and nearly complete proceeding to remove the limitation for Provider-Specific boosters. As outlined above, the stakeholders have already expressed support for removing the restriction for Provider-Specific boosters and have been waiting for the Commission to act. Furthermore, Provider-Specific boosters and wideband boosters do not present the same issues in this context; wideband boosters have different use cases, raise distinct risks of network harms as further outlined below, pose different technical and operational challenges, and are subject to different technical and operational rules.

B. The Market Demand for Provider-Specific Booster Technology Continues to Grow

Since Nextivity’s previous filing on this issue in 2014,⁸ the Provider-Specific consumer signal booster market has continued to grow. Numerous new products have been brought to market with direct benefits to users of mobile phone networks. The goals identified by the Commission when it adopted the initial signal booster rules -- to allow consumers to realize the benefits of using signal boosters while preventing, controlling, and, if necessary, resolving harm to wireless networks⁹ -- have by and large been achieved. Following the Commission’s initial adoption of the signal booster rules in 2013, the demand for consumer signal boosters as an effective

13, 2016) (“There are still far too many parts of this country where broadband is unaffordable, inadequate, or nonexistent...”).

⁶ See, e.g., Pai Carnegie Mellon Remarks at 4 (“The public interest is best served when the private sector has the incentives and freedom to invest and create. That’s why we must eliminate unnecessary barriers to investment that could stifle new discoveries and services. In particular, the government should aim to minimize regulatory uncertainty, which can deter long-term investment decisions.”); Remarks of FCC Commissioner Ajit Pai at the CTIA Wireless Foundation Smart Cities Expo, Washington, DC (Nov. 2, 2016) (“We can’t let unnecessary regulations be the bottleneck that slows our march toward 5G and smart cities.”).

⁷ 47 C.F.R. §§ 20.21(a), (g).

⁸ Comments of Nextivity, Inc., WT Docket No. 10-4 (filed Dec. 29, 2014).

⁹ Amendment of Parts 1, 2, 22, 24, 27, 90 and 95 of the Commission’s Rules to Improve Wireless Coverage Through the Use of Signal Boosters, *Report and Order*, WT Docket No. 10-4, 28 FCC Rcd 1663 (2013) (*Report and Order*);

coverage solution has evolved to include numerous scenarios not initially foreseen when the rules opening the market were first established. Nextivity is aware that signal booster products have been launched to address coverage needs not strictly defined by a narrow view of “personal use.”¹⁰

Since the rules were adopted, Nextivity has launched two new product families in conjunction with various CMRS providers. These are the Cel-Gi GO™ product family and the CEI-Fi QUATRA™ family. Both product lines are being deployed in cooperation with CMRS providers to fill specific coverage needs in a variety of situations. This approach is in keeping with the framework established in the Part 20 signal booster rules which requires Provider-Specific consumer signal booster manufacturers to work closely with CMRS license holders before FCC equipment certification for a Provider-Specific consumer signal booster can be granted.

A key advance that Nextivity has undertaken over the last two years to enhance the close co-operation among Nextivity, CMRS license holders, and equipment installers is the development of the Nextivity WAVE portal™. Through the WAVE portal™, end users and/or installers are not only able to register their consumer signal boosters, but they are also able to provide significant data relating to the operating environment of the signal booster. This information includes, for example, a list of donor cells the consumer signal booster is using to provide coverage. CMRS license holders have access to this web portal at any time, can easily see where all signal boosters are located on their networks, and can get reports of the donor cells being used. This system gives CMRS license holders the ability to quickly find areas with limited coverage and to better understand the capacity load experienced by base stations. Such visibility is invaluable to the CMRS license holder, particularly where the use case has evolved beyond “personal use”, involving an increase in network traffic that can be produced by a typical small business or office.

C. Coordination Between Provider-Specific Booster Manufacturers and CMRS License Holders Required by the Commission Rules Ensures that CMRS License Holders Can Address Interference Protection and Capacity Planning Concerns In the Absence of the “Personal Use” Restriction.

In coordination with CMRS license holders, hospitals, government offices, and other enterprises have deployed Provider-Specific consumer boosters to solve coverage issues in a variety of business environments. Nextivity understands that the results of Provider-Specific booster

¹⁰ The SureCall Force5 cellular signal booster is advertised to be for “Large Building” use and requires some form of professional installation.
<http://www.surecall.com/support/uploads/specsheets/SureCall%20Force5%20Consumer%20Data%20Sheet.pdf>. Similarly, the weboost Connect 4G-X is marketed for office use.
<https://store.weboost.com/products/connect-4gx>.

deployments have been extremely effective with no reported problems by carriers or users. Nextivity attributes the success of these deployments to the close cooperation of Provider-Specific booster manufacturers with CMRS carriers as required by the Commission's rules. Through this process, manufacturers and license holders work together to develop procedures and policies that define where and when to use booster technology. The coordination between Provider-Specific booster manufacturers and CMRS providers thus not only ensures CMRS license holders that booster technology will not cause interference to the network, but it also enables CMRS license holders to plan and manage traffic demands in an environment where signal boosters are deployed without concern that their network capacity plans will be adversely affected by unplanned introduction of signal boosters.

II. The Commission Must Assess the Potential Adverse Impact of Wideband Boosters on Interference Protection and Capacity Planning In the Absence of the "Personal Use" Restriction.

In Nextivity's experience, capacity planning and interference protection are equally important to CMRS license holders. Nextivity discusses below how Provider-Specific boosters and the current system of allowing Wideband consumer signal boosters to be installed in enterprise environments addresses these issues. Further, Nextivity identifies inter-modulation in the downlink direction and customer support issues that should to be addressed in the case of Wideband consumer signal boosters.

A. Traffic Patterns Inconsistent with Capacity Planning

Based on Nextivity's exploration of multiple booster technologies, Nextivity is aware that Wideband boosters present special challenges for CMRS carriers. To protect wireless networks and ensure continued confidence in signal booster technology, the potential harm raised by these devices must be fully addressed before the Commission acts.

One of the key issues that Nextivity and CMRS license holders collaborate on is defining the policies and procedures for the appropriate use of Provider-Specific consumer signal boosters. The typical go-to-market plan that is followed includes detailed discussions and extensive product approval testing by the CMRS license holders. At the completion of this testing, the CMRS license holders typically issue internal guidance to their teams on the appropriate use of a Provider-Specific signal booster. For example, the CMRS license holder may say that a signal booster may not be used with an off-air donor signal to provide coverage in an enterprise if there are more than 30 people in the building. Or, signal boosters with off-air donors may not be used above the 10th floor of an office building. CMRS License holders typically make these judgments to prevent severe performance degradations for a cell arising from uncontrolled proliferation of signal boosters in buildings in an area where the cell infrastructure is fully loaded.

The risk of performance degradation has also increased significantly in the last 2-3 years due to the manner in which “signal bars” on a phone are shown.¹¹ In the days of UMTS- only devices, the number of bars shown on a phone was representative of the signal *strength* the phone was receiving. If a user had only a few bars, it meant his incoming signal was weak and that a consumer signal booster would be beneficial. Today however, the number of bars shown on a phone is mostly determined by the *quality* of the input signal. The lower the signal-to-interference and noise ratio (“SINR”), the fewer bars are shown. Furthermore, low SINR is very often an indication of a cell that is fully loaded, or at or near capacity limits. Therefore, if an IT manager, for example, sees that most users in his or her office have just a few bars on their phones, the manager may choose to install a signal booster to alleviate this problem. However, the signal strength is not the issue and the manager’s decision to add a booster in that instance actually increases the load on an already full base station, thereby exacerbating the problem without the knowledge or consent of the CMRS license holder.

Based on the practical considerations relating to cell capacity, Nextivity believes the Commission should not remove the “personal use” restriction for Wideband consumer signal boosters at this time and before a full examination of this and similar adverse technical implications for carrier networks. In the alternative, at a minimum, the Commission should require Wideband consumer signal boosters that are marketed for use in non-personal use cases to have specific authorization from CMRS license providers for each such use.

B. Intermodulation in the Downlink Direction

The current Part 20 rules include a restriction on the amount of intermodulation that can be tolerated.¹² This level of intermodulation is safe with respect to uplink noise, but it does not take into account the effect of the intermodulation on the quality of the downlink signal. In the “personal use” case, it is unlikely that uplink signals causing intermodulation interference would be present. However, in the case of a Wideband signal booster being deployed in an enterprise environment, this interference risk must be addressed. Testing on Part 20-compliant Wideband consumer signal booster illustrates that significant interference levels can be present on the downlink output of a wideband signal booster if, for example, two LTE calls are being boosted by the signal booster in the uplink direction.¹³

With these levels of downlink interference for Wideband consumer signal boosters, it is undoubtedly possible for one of the CMRS license holder’s customers to see strong signals with poor performance which may appear to the consumer as poor quality in the CMRS network

¹¹ See, e.g., <http://www.cel-fi.com/phonebars/>.

¹² 47 C.F.R. 20.21(e)(8)(i)(F); 47 C.F.R. 20.21(e)(9)(i)(G)

¹³ See Appendix A.

likely leading to an increase in customer complaints. The same risk does not exist for Provider-Specific signal boosters because these devices have no gain outside of their operating bands.

Based on the above concerns, the Commission should not approve the use of Wideband consumer signal boosters in enterprise environments before this intermodulation issue is addressed. In the alternative, the Part 20 standard should be extended to include a standard for the level of acceptable downlink intermodulation caused by uplink signals as a pre-condition to lifting the “personal use” restriction for Wideband consumer signal boosters.

C. Increased Burdens on Carrier Customer Support Systems

The intermodulation issues described above lead directly to an increased probability of calls to the operator complaining of poor signal conditions in enterprise installations. One approach may be to require registration of all Wideband signal boosters installed in enterprise environments with all CMRS license holders in the area in order to provide CMRS license holders with the needed information that a booster may be used to provide coverage and that this could be the source of poor downlink signal quality. However, it can be challenging for carriers to monitor network problems and developing appropriate solutions for poor downlink signal quality caused by intermodulation because the degraded performances may be very intermittent. Therefore, finding the root cause of bad downlink signal quality may be a significant burden on the CMRS provider.

The Part 20 rules were designed so that Wideband consumer signal boosters that comply with the rules could be deployed without the specific support of CMRS providers. Extending the deployment model for Wideband consumer signal boosters beyond the “personal use” case is contrary to this approach and would open CMRS providers up to increased customer troubleshooting not initially contemplated.

III. Conclusion

It is imperative to remove the “personal use” restriction for Provider-Specific consumer signal boosters. The partnerships forged between Provider-Specific consumer signal booster manufacturer and CMRS license holders to solve critical coverage and signal quality problems for consumers, enterprises, government facilities, public safety and many others, warrants Commission action. In 2014, T-Mobile¹⁴ expressed support for such action precisely because of the value that this technology brings to its customers and network without risk of harm to wireless networks or services. Therefore, given the support of all stakeholders, Nextivity urges the Commission to take immediate action.

¹⁴ Comments of T-Mobile USA, Inc., WT Docket No. 10-4 (filed Dec. 29, 2014).

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In contrast, the case of the removal of the “personal use” restriction requested for Wideband booster is not as clear. Such use presents a number of difficult technical and operational challenges that must be resolved before the Commission amends its rules to eliminate the “personal use” restriction for Wideband boosters. As a leading innovator in the signal booster market, Nextivity opposes changes to the rules that would in any way erode the current confidence of CMRS providers and the public in the deployment of signal boosters as a cost-efficient coverage solution that poses no risk to CMRS networks or consumer services. For the reasons outlined herein, Nextivity believes that the removal of the “personal use” restriction for Wideband consumer signal boosters at this time would be premature.

Respectfully submitted,

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Attachment